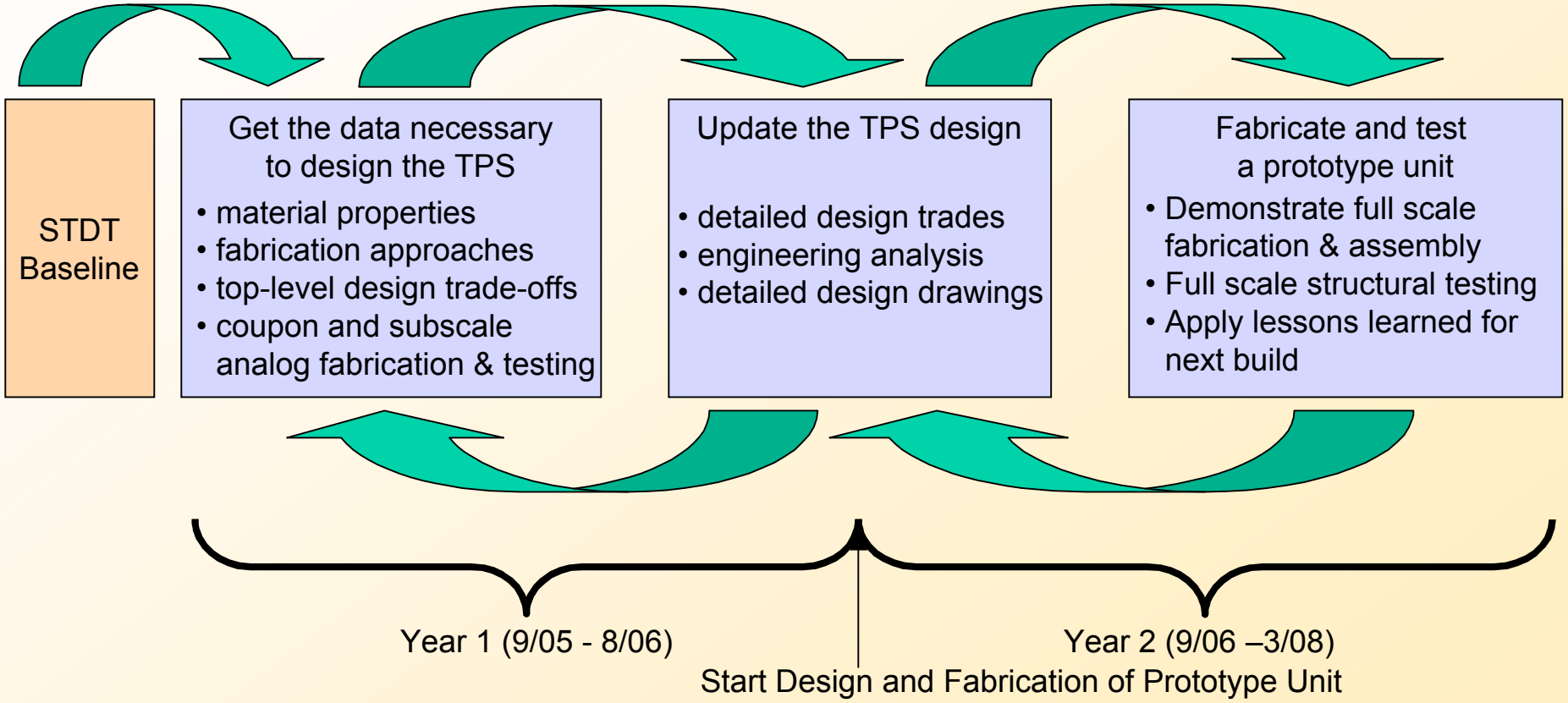
Solar Probe

Targeted Technologies Development Status

Solar Probe Risk Reduction Study – Preliminary Data

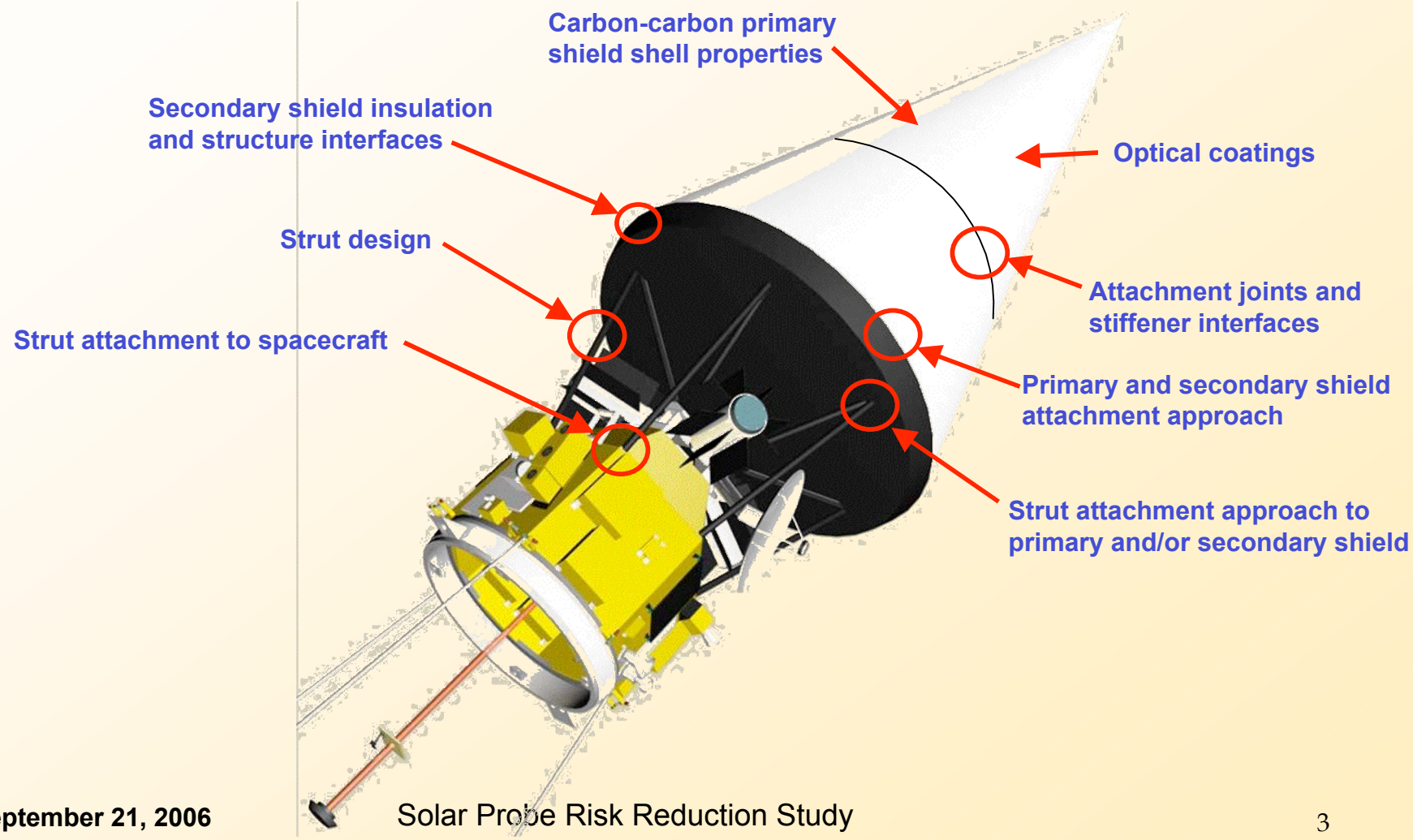
Thermal Protection System Risk Reduction Program

- Planned as two year effort culminating in fabrication and test of full scale prototype unit

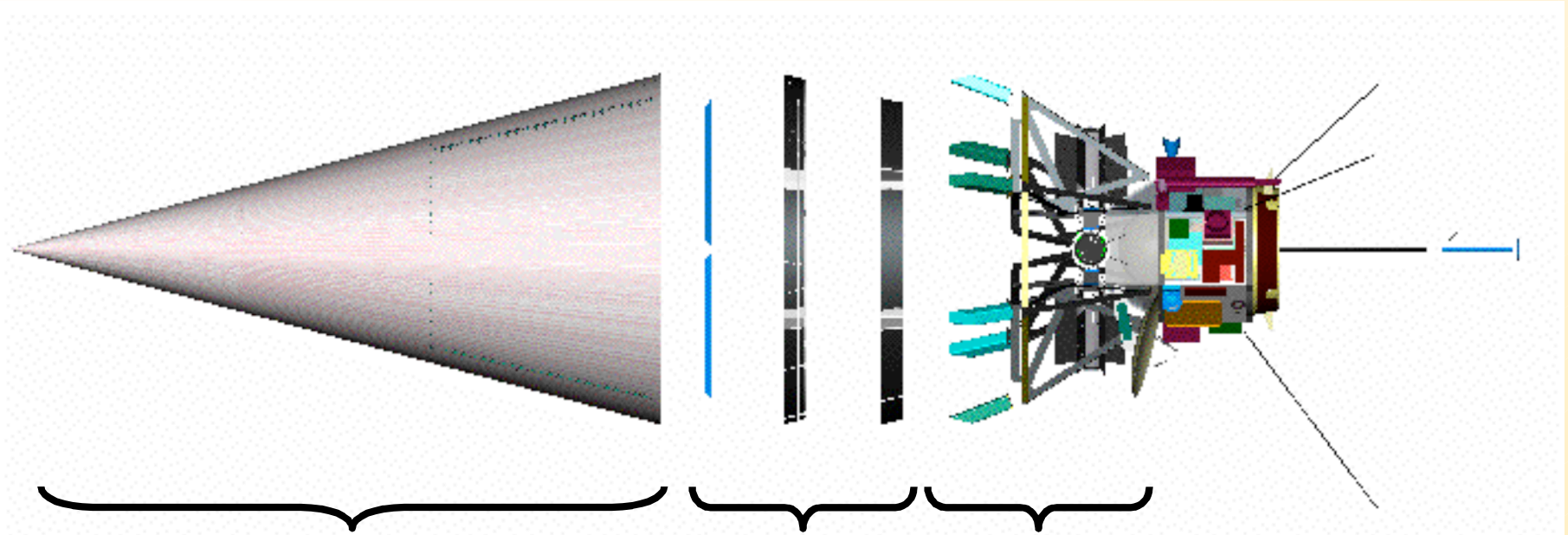


TPS Risk Reduction
First Year Focus Areas

- Coupon testing to obtain material properties and performance at environments
- Full scale analog fabrication and testing in selected areas shown below to reduce risk necessary for development of full scale prototype in second year



Increasing Maturity of Spacecraft TPS and Structure



Solar Probe Risk Reduction Status

- **A detailed design of the Thermal Protection System (TPS) has been conducted, which includes:**
  - Carbon-carbon (C-C) test pieces for the Primary Shield have been designed by APL and manufactured by two vendors (C-CAT, HITCO)
  - Mechanical and environmental tests (thermal, radiation, optical properties) of the C-C coupons have been conducted to confirm the materials selection
  - Selection of the Secondary Shield carbon foam material and integrating designs of the attachment of the Secondary Shield to the Primary Shield Cone have been performed
  - Detailed design of a truss structure to attach the spacecraft to the Primary Shield has been performed
  - A CAD-model using actual coupon thicknesses and measured densities has been developed to provide a mass estimate of the TPS and corroborate the 2005 STDT mass values
- **The project has developed the information necessary to fabricate and test a full-scale prototype of the Thermal Protection System.**
  - The effort consists on the fabrication and testing of the full scale Thermal Protection System prototype unit. This will demonstrate full scale fabrication, assembly and testing capability.